

CLAIMS:

1. An optical measurement station (for use) with a processing machine for processing a semiconductor wafer, the measurement station comprising an optical measuring unit; and a holding unit for receiving the wafer after being processed and
5 holding the processed wafer in a measuring position during measurements, wherein a configuration of said measurement station is such that it is installable within the processing machine.
2. The measurement station according to Claim 1, wherein the measurements are applied to the wafer while in an exit station of said processing machine.
- 10 3. The measurement station according to Claim 1, wherein said measuring unit comprises a spectrophotometer-based optical system.
4. The measurement station according to Claim 1, wherein said measuring unit is operable to measure a thickness of at least a top layer of the wafer.
5. The measurement station according to Claim 1, wherein said measuring unit
15 is operable to carry out optical inspection of the process wafer
6. The measurement station according to Claim 3, wherein said measuring unit further comprises an optical imaging system operable to locate measurements by performing pattern recognition.
7. The measurement station according to Claim 6, wherein said imaging system
20 comprises a charge coupled device.
8. The measurement station according to Claim 1, wherein the measuring unit comprises an optical system including focusing optics for focusing illuminating light onto the wafer and collecting light reflected from the illuminated wafer, and a beam splitter.
- 25 9. The measurement station according to Claim 6, wherein the optical system comprises a focusing optics for focusing illuminating light onto the wafer and collecting light reflected from the illuminated wafer; a beam splitter; and a pin hole mirror.

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10. The measurement station according to Claim 1, and also comprising a support assembly for supporting the processed wafer to be received by the holding unit.
11. The measurement station according to Claim 1, wherein the measuring and holding unit are separated by a window through which at least a part of the wafer being held is viewable to enable optical measurements.
12. The measurement station according to Claim 1, wherein said holding unit comprises an assembly movable along an axis perpendicular to the wafer's surface, thereby enabling said holding of the wafer in the measuring position.
- 10 13. The measurement station according to Claim 1, wherein said optical measuring unit has at least one dimension in a plane by which it is applied to the wafer smaller than that of the wafer's surface.
14. The measurement station according to Claim 1, having at least one dimension in a plane by which it is applied to the wafer about that of the wafer's surface.
- 15 15. An optical measurement station for use with a processing machine for processing a semiconductor wafer, the measurement station comprising an optical measuring unit; and a holding unit for receiving the wafer after being processed and holding the processed wafer in a measuring position during measurements, wherein said measurement station at least one dimension in a plane by which it is to be applied to the wafer about of the wafer's surface, the measurement being installable within the processing machine.
- 20 16. A processing machine for processing a semiconductor wafer, the processing machine comprising a processing tool to be applied to the wafer, and an optical measurement station, the optical measurement station comprising an optical measuring unit; and a holding unit for receiving the wafer after being processed and holding the processed wafer in a measuring position during measurements.
- 25 17. The processing machine according to Claim 16, further comprising an exit station for receiving the processed wafer, said optical measurement station being located within said exit station.
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18. The processing machine according to Claim 16, wherein said processing tool is a polisher.
19. The processing machine according to Claim 16, and also comprising a robot for supplying the processed wafer to the measurement station.
- 5 20. The processing machine according to Claim 16, wherein said measuring unit comprises a spectrophotometer-based optical system.
21. The processing machine according to Claim 16, wherein said measuring unit is operable to measure a thickness of at least a top layer of the wafer.
22. The processing machine according to Claim 20, wherein said measuring unit
10 further comprises an optical imaging system operable to locate measurements by performing pattern recognition.
23. The processing machine according to Claim 16, wherein the measuring unit comprises an optical system including focusing optics for focusing illuminating light onto the wafer and collecting light reflected from the illuminated wafer; and a beam
15 splitter.
24. The processing machine according to Claim 22, wherein the optical system comprises a focusing optics for focusing illuminating light onto the wafer and collecting light reflected from the illuminated wafer; a beam splitter; and a pin hole mirror.
- 20 25. The processing machine according to Claim 22, wherein said imaging system comprises a charge coupled device.
26. The processing machine according to Claim 16, and also comprising a support assembly for supporting the processed wafer to be received by the holding unit.
- 25 27. The processing machine according to Claim 16, wherein the measuring and holding unit are separated by a window through which at least a part of the wafer being held is viewable to enable optical measurements.
28. The processing machine according to Claim 16, wherein said holding unit comprises an assembly movable along an axis perpendicular to the wafer's surface,
30 thereby enabling said holding of the wafer in the measuring position.

29. The processing machine according to Claim 16, wherein said optical measuring unit has at least one dimension in a plane by which it is applied to the wafer smaller than that of the wafer's surface.

30. The processing machine according to Claim 16, wherein said measurement station has at least one dimension in a plane by which it is applied to the wafer about that of the wafer's surface.

31. A processing machine for processing a semiconductor wafer, the processing machine comprising a processing tool to be applied to the wafer, and an optical inspection station, the optical inspection station comprising an optical system; and a holding unit for receiving the wafer after being processed and holding the processed wafer in an inspection position.

32. A method for processing a semiconductor wafer by a processing machine, the method comprising the steps of:

- applying a processing tool of said processing machine to the wafer, thereby performing said processing;
- supplying the processed wafer to an exit station of said processing machine; and
- applying optical measurements to the processed wafer while in the exit station

33. A method for processing a semiconductor wafer by a processing machine, the method comprising the steps of:

- applying a processing tool of said processing machine to the wafer, thereby performing said processing;
- supplying the processed wafer to an exit station of said processing machine; and
- applying optical inspection to the processed wafer while in the exit station.

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